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Oklahoma Wheat Improvement, 1939-40

By HORACE S. SMITH

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Better Wheat for Better Income

The aim of the Oklahoma Farm Wheat Improvement Program is to raise the general quality level of Oklahoma farm wheat. Over 3,800,000 acres in Oklahoma were planted to wheat in the fall of 1939, and this acreage produced approximately 54,000,000 bushels in 1940. Nearly 80 percent of this wheat moves into the baking industry. The baker is the final judge in evaluating wheat quality, and if the loaf of bread he produces is of inferior quality he canont afford to put it on the market as representing the high quality product which he advertises. Oklahoma must produce the wheat to make the flour which enables the baker to sell a high quality product. The improvement of farm wheat quality is purely to increase the income of Oklahoma agriculture.

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Oklahoma Wheat Improvement, 1939-40

By HORACE S. SMITH,

In charge, Oklahoma Farm Wheat Improvement Program.

WHEAT IMPROVEMENT: WHY AND HOW

The Meaning of Quality

Quality is a term which includes a wide range of factors. The present-day system of grading wheat takes into account a number of these elements. Factors considered when the grain inspector issues his certificate are: Mixtures, not of variety but of market classes or types of grain; test weight per bushel; damaged kernels caused by heat, frost, sprouting, insects, etc.; moisture percentage; smut; garlic; weevil damage; and ergot. However, in addition to these physical characteristics of the grain, we have another type of quality, namely, inherent quality. It is not visible to the inspector but becomes apparent when the miller tries to separate the bran layer from the endosperm, or more often when a baker receives flour milled from inherently low-quality varieties, such as Chiefkan and Superhard Blackhull. It may not have desirable dough properties, the volume of loaf may be small, or perhaps the color, grain, or texture is undesirable. Again, the protein in a sample of wheat may be high, yet poor bread-making flour is produced. The quantity of protein is important, but cereal chemists and millers have come to know that the inherent quality may be so low as to seriously affect the baking results. The wheat farmer can to some extent affect the amount of protein by farming practices, but it is greatly dependent upon climate and weather conditions during the growing season. The grower can do much, however, to improve the quality of his wheat by planting varieties of known high quality protein. The purpose of the Oklahoma Farm Wheat Improvement Program is to help the farmers increase their profits by planting pure seed of adapted high quality varieties, to encourage them in seed treatment for smut control, and to avoid rye in their market grain. Only through practice of these measures can farmers hope to maintain and improve the high quality of Oklahoma-grown wheat.

Why Quality Is Important

Why should farmers worry what the millers say regarding certain poor quality varieties? There are several reasons. The future reputation of bread and other products produced from Oklahoma-grown wheat depends upon the quality of grain going into the milling and baking industry of the State. The demand for these products will be reflected to the farm. Quality today means physical quality as measured under the Federal Grain Standards, and also inherent quality in a particular variety as determined by the type of flour and bread produced. Under our present system of marketing farm wheat there is no way to penalize those individuals growing poor quality varieties. However, if certain areas produce a large amount of poor quality wheat a market discrimination is made against that particular area. One person may "get by" growing Chiefkan or Early Blackhull for a number of years—in fact, as long as there is a sufficient amount of high quality wheat being produced in his region. His neighbor, who raises Tenmarq or Turkey, supplies quality to make up the deficiency. However, the average quality level of the wheat produced in that region is

considerably lower than it would be if all the grain was of recommended varieties. The miller and baker recognize differences in varieties and, in many cases, are making preharvest surveys in an effort to spot these poor quality areas so that they can go elsewhere to buy wheat of adapted high quality varieties for their mill mix. Some have said that in time to come millers will find a method of handling varieties which are at present low in baking quality. This may be true; but until such a method is found, these varieties are inferior and should not be grown.

It is to the interest of farmers, grain men, and millers to work together for the good of all in promoting and encouraging the production of only high quality varieties. Only by honest efforts on the part of all these interests can we hope to maintain and improve Oklahoma's reputation as a producer of high quality wheat.

Uniformity Is Also Needed

It is generally agreed that too many varieties are being grown. If we in Oklahoma could plant only high quality varieties recommended by the Experiment Station, the millers and bakers could pretty well tell how to handle the grain and flour to produce the highest quality product. The state would then become increasingly important as a source of uniform wheat which could be depended upon in the milling and baking industries.

How Farmers' Samples Are Tested

The Canadian system of testing farmers' samples was adopted in 1938 as the basis for the Oklahoma Farm Wheat Improvement Program. This plan is being continued. It provides for the collecting of samples by county agents, elevator men, and others. These samples are taken at random so that a cross section of the wheat in a particular area is obtained. Enough seed to plant three rows, 18 feet long, is measured out and planted in the farmers' test plots located in the area where the samples were obtained. In addition, pure check varieties are planted for comparison. This plot is the scene of a field day held at the time the wheat matures in order to show farmers and grain men the type of wheat being grown, and to point out superior qualities of certain varieties. A master nursery, which is made up of single rows eight feet long, is planted at Stillwater. Each farmer's sample from every test plot is included in this nursery and the variety is identified and checked against the wheat planted in the test plots. These samples are graded "A," "B," or "C," according to the variety and its seed purity. To meet "A" grade standards, a farmer's sample has to be 99 percent pure as to variety and has to be of an adapted high quality type relatively free from disease. "B" grade standards permit only a slight mixture of other varieties than the predominating type and these also have to be relatively free from disease. All samples not meeting these grades are classified as "C."

RESULTS OF 1939-40 TESTS

The quality of wheat produced in Oklahoma in 1939-40 has been studied in three ways:

1. Analysis of the farmers' sample plots.
2. Milling and baking tests.
3. Study of the quantity and origin of mixed and smutty wheat.

Plot Analyses

During the 1939-40 season, 1,789 farmers' samples were studied. This was 121 more than in 1938-39. The plots were analyzed to find:

1. The relative proportion of each variety of wheat.
2. The percentage of each variety in each county.
3. The yields of the various varieties planted as checks.
4. The percentage of "A," "B", and "C" grade samples for each county.

Rank of Varieties

From a summary of the data obtained in 1939-40 it was found that Tenmarq, Turkey, and Blackhull constituted over 55 percent of the wheat grown in Oklahoma and that Early Blackhull and Chiefkan make up an additional 16 percent. (Table I.) These data should not be considered conclusive in any sense of the word. Other surveys which have been made included a larger number of samples and covered more counties of the State. However, other surveys were made by inquiry among farmers, and a farmer does not always know the correct name of the variety he is growing. The rank of varieties given in Table I is based on samples which have been correctly identified in test plots; and, despite the apparent limitations of the results, these data do help to give a picture of the kind of wheat being grown in Oklahoma.

Table I.—Proportion of Wheat Varieties in the Oklahoma Crop, 1939-40.
(Based on analysis of 1,221 farmers' samples.)*

Variety	%	Variety	%
Tenmarq	20.7	Smoothhead	2.4
Turkey	17.5	Cheyenne	2.3
Blackhull	17.4	Sibley 81	2.0
Early Blackhull	8.8	Enid	1.2
Chiefkan	7.9	Clarkan	1.0
Mediterranean	5.1	Currell	1.1
Fulcaster	5.0	Redhull	.8
Kawvale	2.5	Kanred	.5
Superhard Blackhull	2.4	Miscellaneous**	1.4

* A total of 1,789 samples were analyzed in 1939-40, but 568 of these were mixed, leaving 1,221 in which a predominant variety could be determined.

** Miscellaneous varieties include Eagle Chief, Harvest Queen, Penquite, Fultz, Ukrainka, Iobred, Gasta, Yorkwin, Cooperatorka, Ilinois.

Variety Percentages by Counties

In Table II, which gives percentage of varieties in each county, no Blackhull or Turkey is shown for a number of counties. This does not mean that these varieties are not being grown, but merely that there were no samples of them in the test plot. It should also be noted that in several instances only a very few samples were analyzed.

Yields of Check Varieties.

The yields of various varieties planted as checks are given in Table III. These check varieties were planted in three-row plots 18 feet long. Sixteen feet of the center row were harvested for yield determinations. This wheat was taken to Stillwater where it was threshed and the yields were calculated. From this table it is evident that certain varieties were not planted in all plots. This is particularly true of the soft red winter types, because only a few plots were planted in the recommended soft red winter wheat belt in Oklahoma.

A number of farmers have said that Chiefkan has outyielded Tenmarq on their farms. This may be true, but average results in the test plots fail to confirm their findings. If one checks the yields from the various plot locations, it is seen that there is no significant difference between the average yields of these two varieties. In 10 of the 19 plots Tenmarq was a

Tabe II.—Percent of Varieti
(Based on analysis

County	Town	Total No. of Samples	Tenmarq (%)	Blackhull (%)	Turkey (%)	Early Blackhull (%
1. Alfalfa	Cherokee	43	50	2	21	9
2. Blaine	Geary	34	46	12	24	6
3. Blaine	Okeene	66	57	--	25	5
4. Caddo	Anadarko	39	3	23	37	28
5. Canadian	El Reno	38	18	3	3	--
6. Comanche	Lawton	63	8	36	13	32
7. Dewey	Seiling	21	14	14	38	--
8. Garfield	Enid	65	28	2	14	3
9. Grady	Amber	22	14	14	14	5
10. Grant	Medford	58	37	--	21	7
11. Harper	Buffalo	7	--	14	86	--
12. Kay	Blackwell	54	34	--	--	17
13. Kay	Ponca City	28	21	--	--	21
14. Kingfisher	Kingfisher	58	14	--	14	14
15. Kiowa	Hobart	46	9	33	13	--
16. Logan	Guthrie	25	28	--	4	20
17. Major	Fairview	32	28	3	48	--
18. Mayes	Pryor	62	2	--	--	--
19. Noble	Perry	15	33	--	--	13
20. Oklahoma	Oklahoma City	63	22	5	11	3
21. Payne	Stillwater	14	30	--	--	--
22. Pottawatomie	Shawnee	11	46	9	9	--
23. Texas	Goodwell	70	1	55	39	--
24. Tillman	Frederick	63	16	72	--	3
25. Tillman	Grandfield	72	8	63	--	28
26. Washita	Cordell	41	27	17	47	--
27. Woodward	Woodward	45	2	20	9	--
28. Woods	Alva	66	11	6	44	11

* 1,789 samples were analyzed but 568 of these were mixed, so that only 1,221 samples could be ide
** Miscellaneous varieties include Eagle Chief, Harvest Queen, Penquite, Fultz, Ukrainka, Iobred, C

the Various Counties, 1939-40.*
21 farmers' samples.)

Chiefkan (%)	Mediterranean (%)	Fulcaster (%)	Kawvale (%)	Superhard Blackhull (%)	Smoothhead (%)	Cheyenne (%)	Sibley 81 (%)	Enid (%)	Clarkan (%)	Currell (%)	Redhull (%)	Kanred (%)	Miscellaneous** (%)
5	--	--	2	--	--	--	--	2	--	--	7	2	--
3	--	--	--	3	--	--	6	--	--	--	--	--	--
--	--	--	--	2	--	5	--	2	--	--	4	--	--
8	--	--	--	--	--	--	--	--	--	--	--	1	--
5	11	57	--	--	--	--	--	--	--	--	--	--	3
6	--	--	2	3	--	--	--	--	--	--	--	--	--
24	--	--	--	5	--	--	--	5	--	--	--	--	--
3	--	--	--	2	14	6	9	10	--	5	2	--	2
--	22	--	--	--	31	--	--	--	--	--	--	--	--
5	--	7	--	5	2	2	10	--	--	--	2	--	2
--	--	--	--	--	--	--	--	--	--	--	--	--	--
13	2	2	2	--	--	--	13	--	4	6	--	--	7
15	--	7	7	--	--	--	11	--	11	7	--	--	--
12	--	30	2	--	10	2	--	2	--	--	--	--	--
7	--	--	--	36	--	2	--	--	--	--	--	--	--
12	12	--	--	--	4	--	--	--	8	8	--	--	4
9	--	--	--	--	3	--	--	9	--	--	--	--	--
2	57	2	34	--	--	--	--	--	--	--	--	--	3
--	--	--	--	--	20	--	--	7	7	7	--	--	13
18	16	13	--	--	2	--	--	--	2	3	--	2	3
14	7	21	21	--	--	--	--	--	7	--	--	--	--
--	18	18	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	1	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	3	--	--	3	--
--	--	--	--	--	--	--	--	--	--	--	--	--	1
--	--	--	--	5	--	2	--	--	--	--	--	2	--
36	--	--	--	--	--	33	--	--	--	--	--	--	--
16	--	--	--	2	--	2	--	--	--	--	5	--	3

s predominantly one variety.
orkwin, Cooperatorka, and Illinois.

Table III.—Yield in Bushels per Acre of the Wheat Varieties Harvested From 19 Wheat Testing Plots, Oklahoma Farm Wheat Improvement Program, 1940.

VARIETY	Av. Yield by Varieties	Cherokee, Alfalfa Co.	Geary, Blaine Co.	Anadarko, Caddo Co.	El Reno, Canadian Co.	Lone Grove, Carter Co.	Lawton, Comanche Co.
Turkey	19.9	28.6	19.0	24.9	13.2	7.3	11.3
Kanred	20.2	28.5	19.3	22.2	11.5	5.6	13.2
Cheyenne	18.8	21.6	22.0	16.4	11.0	3.0	11.3
Kharkof	18.3	28.8	20.7	22.6	15.7	6.2	11.9
Tenmarq	21.0	30.2	18.0	23.0	22.4	10.7	8.2
Oro x Tenmarq	20.6	33.2	24.1	20.4	12.5	13.8	11.4
Blackhull	20.3	28.1	24.1	20.3	16.8	6.2	14.0
Superhard Blackhull	21.4	22.9	19.6	25.2	12.4	--	12.3
Early Blackhull	17.7	29.1	16.3	19.8	15.1	9.2	7.6
Chiefkan	20.9	32.6	19.5	30.6	19.9	5.5	11.1
Chiefkan Deluxe	19.3	31.5	17.4	30.5	14.6	6.6	8.4
Redhull	15.0	--	22.8	15.7	14.0	--	11.5
Smoothhead	17.5	29.2	19.9	22.1	14.2	6.5	8.8
Ukrainka	14.7	25.5	19.0	18.0	7.1	3.6	9.0
Sibley 81	16.7	27.2	16.6	18.6	9.0	9.3	8.7
Eagle Chief	18.2	32.6	21.3	20.6	9.4	8.1	11.7
Iobred	14.7	27.7	20.3	19.3	10.1	8.1	5.9
Kawvale	15.7	29.8	17.1	25.4	7.9	6.2	8.9
Fulcaster	12.6	28.8	19.3	19.6	11.4	2.6	7.4
Mediterranean	13.5	19.0	21.2	17.7	12.0	9.2	6.8
Currell	13.0	--	15.3	16.4	15.3	4.0	6.9
Harvest Queen	14.8	--	20.5	20.3	14.8	8.4	8.4
Clarkan	17.8	28.5	21.0	24.3	17.1	5.9	8.9
Turkey 1008	17.4	--	25.8	17.9	--	--	--
Nebred	19.2	33.1	28.6	17.9	15.3	7.0	8.7
Denton	14.8	25.0	16.8	--	--	10.2	7.0
Kruse	32.8	--	--	--	--	--	--
Penquite Selection	16.4	--	--	--	--	--	11.0
Fultz	13.1	--	--	--	--	--	--
Red May	16.4	--	--	--	--	5.1	--
Poole	11.4	--	--	--	--	6.5	--
Mo. Early Beardless	13.2	--	--	--	--	9.5	--
Kentucky Currell	10.9	--	--	--	--	--	--
Redhart	10.0	--	--	--	--	6.7	--
Alton	16.6	--	--	--	--	--	--
Av. Yield by Plot	**17.0**	**28.3**	**20.2**	**21.1**	**13.4**	**7.1**	**9.6**

Table III.—Continued.

VARIETY	Enid, Garfield Co.	Amber, Grady Co.	Blackwell, Kay Co.	Ponca City Kay Co.	Hobart, Kiowa Co.	Guthrie, Logan Co.	Perry, Noble Co.
Turkey	23.1	27.3	12.0	9.4	11.6	19.8	17.4
Kanred	26.1	26.1	12.7	12.0	15.3	13.0	17.3
Cheyenne	24.5	24.9	18.2	12.3	17.7	10.9	17.2
Kharkof	27.3	22.5	21.7	11.3	16.2	12.9	14.8
Tenmarq	25.1	25.4	16.5	13.5	21.2	9.4	17.0
Oro x Tenmarq	30.7	25.6	19.1	13.8	11.1	11.7	16.4
Blackhull	26.9	27.8	18.9	9.3	18.5	12.0	17.5
Superhard Blackhull	26.6	22.8	28.5	10.6	18.2	10.1	19.3
Early Blackhull	20.4	27.4	19.9	12.1	17.0	9.3	12.4
Chiefkan	22.8	27.1	31.0	10.4	20.0	14.8	17.8
Chiefkan Deluxe	16.9	25.3	26.6	10.1	15.3	10.7	15.6
Redhull	--	--	16.8	8.0		11.6	--
Smoothhead	25.3	25.7	15.5	11.6	8.1	13.4	15.6
Ukrainka	12.9	21.7	11.7	9.4	12.5	10.0	15.2
Sibley 81	23.1	24.1	9.4	9.3	4.7	12.6	15.7
Eagle Chief	19.9	24.7	12.0	11.1	15.2	10.5	17.9
Iobred	14.3	20.8	6.2	9.0	8.7	10.4	13.0
Kawvale	12.6	20.1	9.5	6.5	11.4	10.6	18.3
Fulcaster	13.7	17.0	4.0	4.1	10.9	10.2	10.9
Mediterranean	14.8	15.1	10.1	7.5	9.8	6.8	15.5
Currell		19.0	--	4.8	11.3	8.8	8.6
Harvest Queen	10.9	19.4	12.4	7.3	16.1	6.9	12.9
Clarkan	28.2	21.9	18.9	10.1	14.5	10.6	15.3
Turkey 1008	27.2	--	15.9	10.5	--	--	--
Nebred	29.0	29.7	13.5	14.8	19.3	11.9	16.8
Denton	--	21.8	8.0	5.9	11.7	9.9	14.4
Kruse	--	--	--	--	--	--	--
Penquite Selection	--	--	--	--	--	--	--
Fultz	--	--	--	--	--	13.8	--
Red May	--	--	--	--	--	--	17.2
Poole	--	--	--	--	--	--	9.6
Mo. Early Beardless	--	--	--	--	--	--	9.4
Kentucky Currell	7.5	--	--	--	--	--	--
Redhart	--	--	--	--	--	--	--
Alton	16.6	--	--	--	--	--	--
Av. Yield by Plot	**21.1**	**23.5**	**15.4**	**9.8**	**14.0**	**11.3**	**15.1**

Table III.—Continued.

VARIETY	Oklahoma City, Oklahoma Co.	Stillwater, Payne Co.	Shawnee, Pottawatomie Co.	Frederick, Tillman Co.	Grandfield, Tillman Co.	Alva, Woods Co.
Turkey	46.6	20.1	28.8	17.2	17.7	22.2
Kanred	53.4	30.8	27.0	19.4	9.4	20.8
Cheyenne	44.3	28.1	22.0	18.3	12.4	22.0
Kharkof	--	25.8	21.0	15.9	11.7	21.6
Tenmarq	50.0	31.9	24.2	20.8	12.0	20.3
Oro x Tenmarq	44.0	33.7	24.3	19.0	8.5	17.5
Blackhull	45.3	26.2	25.2	19.0	10.9	18.9
Superhard Blackhull	46.7	31.0	25.6	18.5	12.9	21.8
Early Blackhull	--	31.5	24.7	18.9	13.2	15.2
Chiefkan	37.4	30.4	25.8	17.3	11.1	20.2
Chiefkan Deluxe	29.2	30.7	24.0	17.9	17.3	18.0
Redhull	--	--	--	18.2	11.9	19.9
Smoothhead	27.0	20.0	25.0	14.5	12.0	17.3
Ukrainka	24.2	24.0	16.0	13.4	5.6	21.2
Sibley 81	33.5	25.6	24.0	15.2	8.1	22.4
Eagle Chief	31.8	27.4	22.7	17.6	15.6	15.6
Iobred	--	22.0	16.0	15.1	13.6	23.3
Kawvale	20.4	23.7	22.8	14.8	10.2	22.3
Fulcaster	10.2	10.9	21.6	12.3	7.0	17.3
Mediterranean	12.6	16.8	23.2	13.7	6.1	18.4
Currell	29.2	17.4	22.2	8.9	6.2	--
Harvest Queen	25.8	13.6	25.6	15.2	8.9	18.2
Clarkan	--	21.7	28.2	15.7	11.1	19.2
Turkey 1008	--	29.1	--	10.0	--	20.8
Nebred	--	28.8	23.9	17.6	12.0	19.2
Denton	31.6	14.9	--	--	--	--
Kruse	32.8	--	--	--	--	--
Penquite Selection	--	21.8	--	--	--	--
Fultz	--	15.2	--	--	10.4	--
Red May	--	20.3	22.9	--	--	--
Poole	--	12.9	16.7	--	--	--
Mo. Early Beardless	--	13.9	19.9	--	--	--
Kentucky Currell	--	14.3	--	--	--	--
Redhart	--	8.0	15.2	--	--	--
Alton	--	--	--	--	--	--
Av. Yield by Plot	**33.8**	**22.6**	**22.9**	**16.2**	**11.0**	**19.7**

better yielder than Chiefkan. For those who are growing Early Blackhull, other comparisons should be made. The average yield of Tenmarq was 3.3 bushels higher and it outyielded Early Blackhull in all but four of the 18 plots. This difference is highly significant statistically.

Time and time again, chemists, millers, and bakers have shown by careful milling and baking procedure that these two varieties, Chiefkan and Early Blackhull, are decidedly inferior in baking quality to Tenmarq and Turkey. There is no favoritism shown in these tests. In most cases the chemists and others concerned know the samples only by code number.

Percentages of "A," "B," and "C" Samples.

Table IV gives the percentage of "A," "B," and "C" grade samples for each county. The basis of grading is described on page 6.

Results of Milling and Baking Test

During the fall of 1940, a number of hard red winter wheat samples which were exhibited by farmers of the State at several county fairs were sent to milling and baking laboratories for complete tests, after being

Table IV.—Percentage of Total Number of Samples Within Each Grade, by Counties, 1939-40.

(Based on analysis of 1,789 farmers' samples.)

County	Town	Total No. of Samples	Percent "A" Grade	Percent "B" Grade	Percent "C" Grade
(1) Alfalfa	Cherokee	48	39	22	39
(2) Blaine	Geary	37	19	32	49
(3) Blaine	Okeene	68	40	37	23
(4) Caddo	Anadarko	44	5	14	81
(5) Canadian	El Reno	82	2	4	94
(6) Comanche	Lawton	83	2	7	91
(7) Dewey	Seiling	27	4	15	81
(8) Garfield	Enid	79	9	16	75
(9) Grady	Amber	37	8	14	78
(10) Grant	Medford	79	13	29	58
(11) Harper	Buffalo	10	0	60	40
(12) Kay	Blackwell	81	6	14	80
(13) Kay	Ponca City	61	2	10	88
(14) Kingfisher	Kingfisher	69	7	7	86
(15) Kiowa	Hobart	66	2	15	83
(16) Logan	Guthrie	45	0	16	84
(17) Major	Fairview	43	19	9	72
(18) Mayes	Pryor	83	14	10	76
(19) Noble	Perry	36	3	14	83
(20) Oklahoma	Oklahoma City	94	7	14	79
(21) Payne	Stillwater	32	3	25	72
(22) Pottawatomie	Shawnee	28	0	21	79
(23) Texas	Goodwell	88	9	22	69
(24) Tillman	Frederick	128	2	31	67
(25) Tillman	Grandfield	101	4	11	85
(26) Washita	Cordell	56	23	32	45
(27) Woodward	Woodward	103	0	21	79
(28) Woods	Alva	81	14	23	63
	Total No.	1,789	159	325	1305
	Percent of total	100.0	8.9	18.1	73.0

judged on external appearance. The data presented in Table V are the average results for the indicated varieties as obtained from individual milling and baking scores for each sample.

All of these samples were submitted to the milling and baking laboratories under a blind entry number and no sample was given any advantage in method of handling or scoring.

The average score of Tenmarq was over 10 percent better than Chiefkan, and Turkey was 8.6 points higher than Chiefkan in total score. Chiefkan was inferior in flour color, dough properties, volume of loaf, crumb color, grain, and texture.

These data add more evidence to the large amount already available which clearly shows the inferiority of Chiefkan, particularly from a baking standpoint.

Table V.—Average Results of Milling and Baking Contests.*

	Max. Score	Tenmarq Av. 12 Samples	Turkey Av. 3 Samples	Blackhull Av. 5 Samples	Chiefkan Av. 7 Samples
Wheat protein	2.0	2.0	1.7	1.8	1.9
Flour yield	3.0	2.9	3.0	3.0	2.9
Flour granulation	4.0	4.0	4.0	3.8	3.7
Flour color	5.0	4.8	4.7	4.2	3.6
Flour ash	3.0	3.0	2.7	2.9	2.9
Water absorption	5.0	4.6	4.7	4.3	4.6
Dough properties	15.0	14.8	14.0	13.0	12.7
Crust color	2.0	1.8	1.7	1.7	1.9
Symmetry of form	2.0	1.7	1.8	1.7	1.5
Character of crust	3.0	2.6	2.3	2.6	2.2
Break and shred	3.0	2.6	2.5	2.6	2.3
Volume	15.0	13.7	14.7	14.0	13.0
Crumb color	10.0	9.5	9.3	8.7	7.8
Aroma	4.0	4.0	4.0	4.0	4.0
Taste	4.0	4.0	4.0	4.0	3.8
Grain	10.0	9.6	8.7	9.0	7.9
Texture	10.0	9.6	9.3	8.8	7.8
Total score	**100.0**	**95.2**	**93.1**	**90.1**	**84.5**

* The number of samples milled and baked for each variety was not constant because the entries at two of the fairs were not classified as to variety and Tenmarq and Chiefkan constituted the greater number of these entries.

Wheat Inspection Summary

The amount and origin of mixed wheat, rye mixtures, and smutty wheat delivered to three terminals in Oklahoma in 1940 was determined from the inspectors' certificates issued at Enid, Oklahoma City, and Ponca City.* The data are shown in the accompanying maps.

Mixed Wheat.

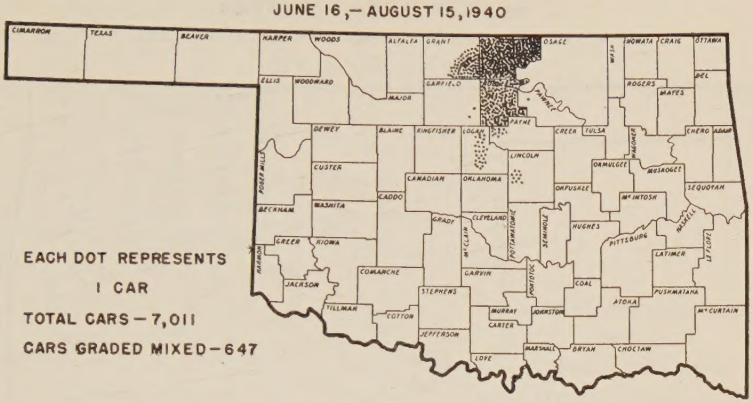
Mixed wheat, as so graded, does not refer to varietal mixtures but to mixtures of two or more classes. In Oklahoma these mixtures are between hard red winter and soft red winter types. A total of 9.2 percent of the cars inspected between June 16 and August 15, 1940, contained mixtures of hard and soft wheat. Eighty-eight percent of this mixed wheat was produced in four counties.

* The author wishes to express appreciation to Howard N. Holmes, federal supervisor, grain grading division, U. S. D. A., Enid, Okla., for furnishing these data.

MIXED WHEAT SURVEY

RECEIPTS AT ENID, OKLAHOMA CITY, AND PONCA CITY

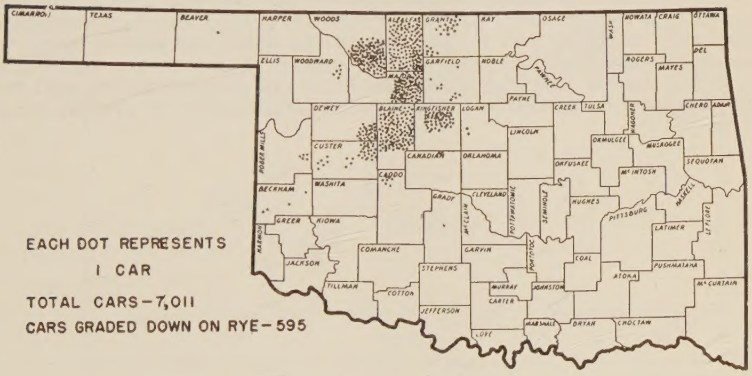
JUNE 16,—AUGUST 15, 1940



FOREIGN MATERIAL SURVEY

RECEIPTS AT ENID AND OKLAHOMA CITY JUNE 16,—AUGUST 15, 1940

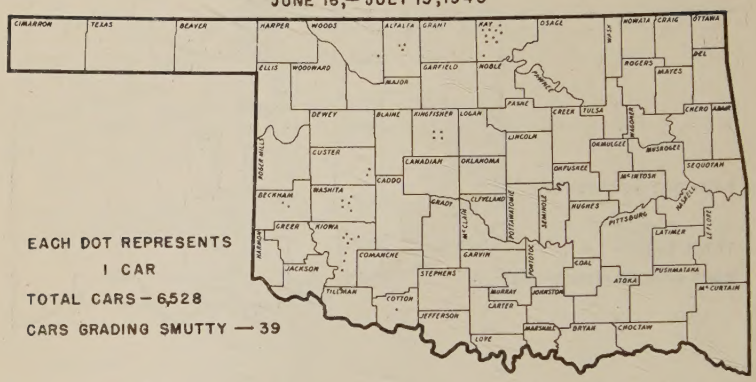
CARS DEGRADED ON FOREIGN MATERIAL (RYE)



As a rule, mixed wheat sells at 2 to 3¢ per bushel under the market price of No. 1 dark hard winter, another reason why pure varieties should be planted.

Rye Mixtures.

Rye is graded as foreign material under the Federal Grain Grading System. Eight and one-half percent of the wheat inspected from June 16 to August 15, 1940, contained sufficient rye to be graded below No. 1. Eighty-eight percent of the rye mixtures originated in four counties. Why do farmers continue to plant seed wheat containing rye, or to plant pure seed in soil containing rye, when a discount of 2 to 3¢ per bushel is made against marketable wheat containing appreciable amounts of rye?



Smutty Wheat.

The amount of smutty wheat received in 1940 was considerably less than in 1939. Only .6 of 1 percent of the cars graded were marked smutty. These were scattered over a wide area of the State and may indicate that farmers are treating their seed more generally. However, the soil was dry at seeding time in 1939 and during the early fall growing season, and these conditions are not conducive to widespread germination and growth of smut spores.